Catalogue of American Amphibians and Reptiles.

ZWEIFEL, RICHARD G. 1968. *Rana boylii.*

Rana boylii Baird
Foothill yellow-legged frog

Rana boylii Baird, 1854:62. Type-locality, "California (interior.)"; stated by Cope (1889:445) to be Eldorado County, California. Syntypes (2), U. S. Natl. Mus. 3370, collected by Dr. C. C. Boyle; date of collection unknown (not seen by author).

Rana nigricans: Boulenger, 1882:42. *Boylii* considered a possible synonym of *nigricans* (= *clamitans*).

Rana pachyderma Cope, 1883:25. Type-locality, "McCloud River" [at Baird, Shasta County, California] and "Ashland [Jackson County] at the northern base of the Siskiyou Mountains, Oregon." Syntypes are not specified in the literature, but presumably are Acad. Nat. Sci. Philadelphia 14569–70 (Ashland) and 14571–75 (McCloud River, examined by author). The McCloud River specimens bear Cope collection tags, but the Ashland specimens cannot be found (E. V. Malnate, *in litt.*, February 1968). Cope (1889:444) synonymized this species with *boylii.*

Rana Draytoni: Boulenger, 1891:453. *Boylii* treated as a synonym of *draytonii.*

Rana boylii boylii: Camp, 1917:117. First use of trinomial.

Rana boyli boyli: Schmidt, 1953:84. Emendation of ending.

Rana boylei: Zweifel, 1955:212. Emendation of ending and reëstablishment of *boylii* as a monotypic species.

• CONTENT. The species is monotypic.

• DEFINITION AND DIAGNOSIS. A member of the *Rana boylii* species group (Zweifel, 1955) with inner and outer metatarsal tubercles and with paired subgular vocal sacs in the male. Males attain a maximum snout–vent length of about 56 mm; females, about 73 mm. A light band across the top of the head is sharply demarked from the posterior color. The ground color of the ventral surfaces is white, overlaid posteriorly with yellow, especially on the hind legs. The larva has 12 or 13 rows of labial teeth.

Rana aurora and *R. cascadae* occur in sympatry with *R. boylii.* Both *aurora* and *cascadae* usually have distinct dorsolateral folds (indistinct in *boylii*), relatively smooth tympana (granular), less toe webbing (fully webbed), and dark eye-mask markings. In addition, *aurora* is distinguished by red coloration of the undersides, particularly on the hind limbs. *Rana boylii* and *R. muscosa*, for which only very limited sympatry is known, differ in that *muscosa* lacks the light band across the top of the head, lacks vocal sacs, and has a pale yellow ventral ground color rather than white with yellow legs. The larva of *muscosa* has seven rows of labial teeth.

• DESCRIPTIONS. Storer (1925) gave good descriptions of adult and larval *boylii.* Zweifel (1955) discussed geographic variation in color pattern and proportions of adults, and emphasized characteristics of adults and larvae that distinguish *boylii* from *muscosa.* Cope (1889) redescribed a syntype in detail. For other useful descriptions, see Camp (1917), Slevin (1928), and Wright and Wright (1949). Stebbins (1951, 1966) described the voice, but it is as yet only poorly known.

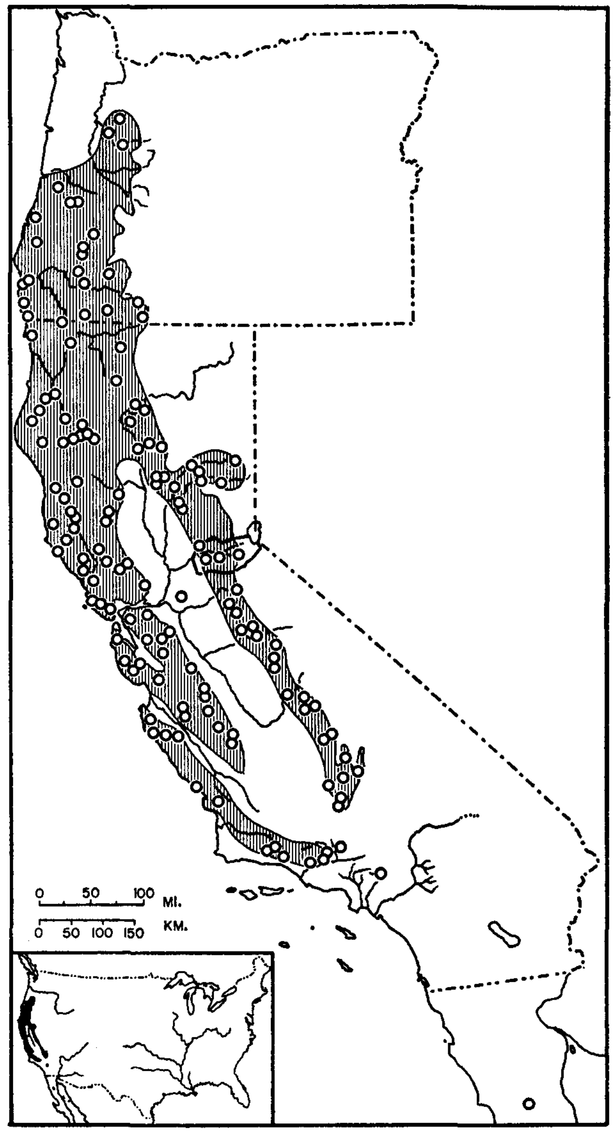
• ILLUSTRATIONS. Excellent water-color paintings of adults (dorsal and ventral views) were made by Stebbins (1959, 1966); Dickerson (1906) presented a colored photo. Black-and-white photographs appear in several publications: Storer, 1925; Slevin, 1928; Pickwell, 1947; Wright and Wright, 1949; Zweifel, 1955. Stebbins (1951, 1954) illustrated the adult with drawings. Cope (1889) presented drawings of details of a syntype of *boylii,* and figures in Cooper (1860, pl. 29, figs. 2 and 3) probably represent the syntypes. For illustrations of eggs and larvae, see Storer (1925) and Pickwell (1947; egg mass), Wright and Wright (1949; egg only), Stebbins (1951, 1966; egg, larva and mouthparts), and Zweifel (1955, egg, larva and mouthparts). Other illustrations were given by Zweifel (1955; skull, pectoral girdle, hind foot, skinned throat to show vocal sacs, color patterns of throat), and Blair (1947, hind foot).

• DISTRIBUTION. *Rana boylii* ranges from northwestern Oregon to northern Baja California. "In California, *boylei* inhabits coastal foothill and mountain regions from the Oregon border southward, west of the central valley, to Ventura County. Isolated populations occur in Los Angeles County [Marr, 1943; Zweifel, 1955]. East of the Great Valley, the range extends along the western flank of the southern Cascade Range and Sierra Nevada from Siskiyou County south to Kern County..." (Zweifel, 1955:215). For comprehensive lists of locality records, see Storer (1925), Slevin (1928), and Gordon (1939); Zweifel (1955) mapped all known localities and listed records for critical regions. Richards (1958) evidently confused *R. boylii* and *R. muscosa* in the Yosemite region.

Two important range extensions have been recorded since Zweifel's (1955) summary. Loomis (1965) reported specimens from La Grulla Meadow, 6700 ft., in the Sierra San Pedro Martir of Baja California Norte, Mexico, nearly 300 miles south of the previously known range. Livezey (1963) speculated that the presence of *boylii* on the floor of the Central Valley of California 5 miles north of Lodi, San Joaquin County, may have been due to waif dispersal.

Rana boylii is a stream frog, commonest where a mixture of sandy and rocky banks provide sunning sites. It ranges in elevation from virtually sea level in coastal California to 6000 ft. in the northern Sierra Nevada and 6700 ft. in Baja California.

• FOSSIL RECORD. No fossils are known.



MAP. The type-locality, Eldorado County, is outlined. Symbols record known localities. Shading indicates areas within which distribution is essentially continuous; isolated symbols mark disjunct populations.

• **Pertinent Literature.** Storer (1925) gave the best and most extensive discussion of the life-history and ecology of *boylii*. Zweifel (1955) summarized existing knowledge, added original information and provided ecological comparisons among *boylii* and the sympatric species *aurora* and *muscosa*. Information on food habits, habitat and predation (by *Thamnophis couchii hydrophila*) in Oregon was given by Fitch (1936), who also (1941) recorded predation by *Thamnophis sirtalis*. Brattstrom (1962) discussed behavior of tadpoles, and (1963) recorded body temperatures of adults. Twitty *et al.* (1967) found newly-metamorphosed *boylii* dispersing away from streams. Notes on habitat or other features of ecology are found in works by Grinnell et al. (1930), Grinnell and Storer (1924), Loomis (1965), Myers (1930), and Wright and Wright (1949). Witschi (1955) noted that the larva possesses a bronchial columella, and Gosner (1959) described the teeth of the tadpole. Blair (1947) compared *boylii* with Mexican members of the *boylii* species group. Zweifel (1954) compared some skeletal elements of *boylii* and other species of *Rana*. Peabody and Savage (1958) included *boylii* in a discussion of biogeography. Switak (1967) reported albinism.

• **Nomenclatural History.** Several decades elapsed between the description of *boylii* in 1854 and its acceptance as a valid species. Neither Cope (1875) nor Yarrow (1882) mentioned the species in their check lists, and Boulenger (1882) referred it, with question, to the synonymy of *Rana nigricans* (a synonym of *Rana clamitans*). Cope, who described *Rana pachyderma* (1883) without reference to *boylii*, later (1886) listed both *pachyderma* and *boylii* as valid species and finally (1889) reduced *pachyderma* to a synonym of *boylii*. Boulenger (1891), still unwilling to recognize *boylii*, considered it a synonym of "*R. Draytoni*" (= *R. aurora draytonii*). Stejneger (1893) replied forcefully to Boulenger in affirming the specific status of *boylii*. Camp's (1917) establishment of *boylii* as a polytypic species was widely accepted though again Boulenger (1919, 1920) demurred, and treated Camp's subspecies as synonyms of *boylii*. Zweifel (1955) also considered *boylii* to be a monotypic species, but elevated one of Camp's subspecies, *muscosa*, to specific rank.

• **Remarks.** See Zweifel (1968) for remarks on sympatry between *Rana boylii* and *R. muscosa*, and for comments on the possibility of natural hybridization.

• **Etymology.** *Rana boylii* is named for the collector of the syntypes, Dr. C. C. Boyle.

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